STC-01Z type

Steppermotor Controller

Useful for:

Roboticized bag machine controller;
Roboticized cut machine controller;
Powder packing machine controller;
Others stepper motor monospindle controller you want to use

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Chapter one system characteristic

- **count of axes:**monopodium;
- **characteristic of instruction:**random programmable（Can carry out various complications movement: Fixed position control and Not fixed position control）;
- **Tallest output frequency**: 40 KHz（specially suit subdivision driver）;
- **distinguishability of the output frequency**: 1Hz;
- **size of progam:**maximum is 99;
- **input point:**6 （photocoupling）;
- **output point:** 3 （photocoupling）;
- **displacement range:**-7999999 ~ +7999999;
- **work status:** Manual running status、automatic running status、progamme eidt status、parameter setup status;
- **curve of rising/falling speed**: 2（optimization）;
- **display function:**8 bits led display, manual／auto status display、moving／stop status display、step count／count value/program display、edit program, parameter display、input／output status display、CP pulse and direction display;
- **auto running function:**programmable, control startup and stop under auto-running state by key-press and level on th port.
- **manual running function**: allow adjusting the position（manual inch speed and inch step are setuped）;
- **parameter setup function**: allow setuping start-up frequency、curve of riseing/falling speed、reverse clearance、manual length、manual speed、interrupt jump line number and return zero speed;
- **edit program function**: allow randomly inserting、deleteing and modify program。With jump line number、the data judge zero、number of sentence beyond maximum or over minimun test function;
- **return zero function**: can bothway auto return to zero;
- **set of program instruction**: total is fourteen;
- **exterior operation function:** allow executing exterior interrupt operation by setuping parameter and programing turn on /off the A port and the B port.;
- **power supply:**AC220V（power supply error <=±15%）。

Chapter one: front view

The picture of the before（chart1）
contain:

1. eight bits LED display;
2. six show lamp of input state;
3. three show lamp of output state;
4. show lamp of CP pulse signal;
5. show lamp of DIR direction;
6. key-press: total 10 key,
   and most are multifunction,
   that have different function in different
   state ,in introduce one function of them
   deputy one key-press name 。

chart1 the picture of the before

chapter three:the picture of the hehind and introduce of signal

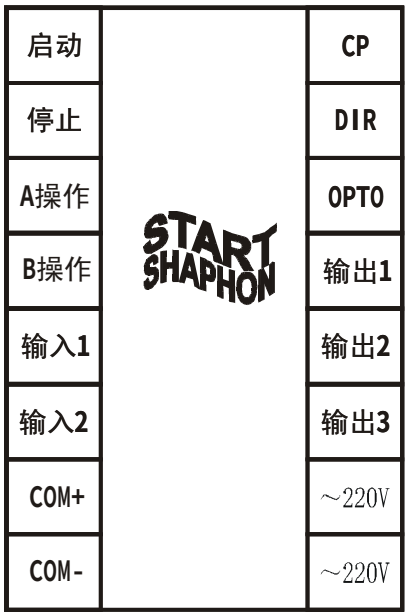

Chart 2: picture of behind

the picture of the behind (chart2) connect port,
contain:

1. 启动 startup program , is equivalent to key 启动 on the control panel。

2. 停止 pause program that is auto running, is equivalent to 停止 on the control panel,
   If startup again,program continue to run。

3. A 操作 and B 操作 this is characteristic of the controller: Usually to steppermotor, we carry on fix quantify and fix position control, Such as control the electrical engineering circulates the certain to move the quantity with the certain speed, this way is solved very easily, needing to

1. CP、DIR、OPTO connect control line of stepper motor driverThis three port connect corresponding ports of driver:
   CP---------pulse signal
   DIR--------rotation direction signal
   OPTO----share+ port for CP OPTO.
   State of CP、DIR have corresponding show lamp。

program the speed and the displacement only then,but there is a lot of control that are not confirm beforehand, For example steppermotor orders to start circulate toward a direction from the start point ,until run into route of travel switch, then again the opposite side return to the start point 。Again for example request the electrical engineering between two route of travel switches the back and forth circulates the N times。In these examples ,we do not know the displacement that steppermotor circulate ,in advance, how do we edit the program? This controller resolved into this problem by "interrupt" , this controller established two independent "interrupt", we call it as" the A operate" and" the B operation". as " the A operation" as an example, workflow is:

when the program is running,the "A operation" port has signal of input.the steppermotor reduct the speed till stop.program is interrupted at this line.and remember the coordinate value at the interrupt.program jump enterance address of program of the "A operation".

输入 1 and 输入 2 input port of current switch 。

5. 输出 1 、输出 2 and 输出 3 output port of current switch。

6. COM+ 、COM- output,intput port of external power supply, power supply is DC12V/0.3A, COM+is +, COM-is -, this power supply is provide by the controller。

7. ~220V input port of controller's power supply。

Interface circuit of input signal and output signal :

This controller's "startup"、"stop"、"A operation"、"B operation"、"input1"、"output2" are input signal, they have the same interface circuit of input。"output1"、 "output2"、 "ouput3" are output signal, they have the same interface circuit of output. for the sake of assurance that there is no mutual interference in inside and outside of controller

both input and output circuit have the photocoupling, interior power supply (+5V)and exterior power supply are mutual independence, there two power supplies is provided by independent transformer in the controller.

The state of input signal and output signal have show lamp in the panel correspondingly.for input signal, low level (switch closed) lamp turn on, whereas lamp off; for output, when ouput is 0,level is low, lamp off, whereas lamp on

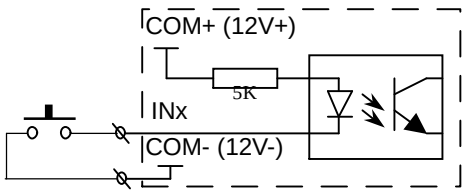

Chart 3: switch value

F connect switch, input low level (0 level), Show lamp is on in the panel, define 0; vice versa

F for startup ,stop, A,B operation, the moment of conection is valid

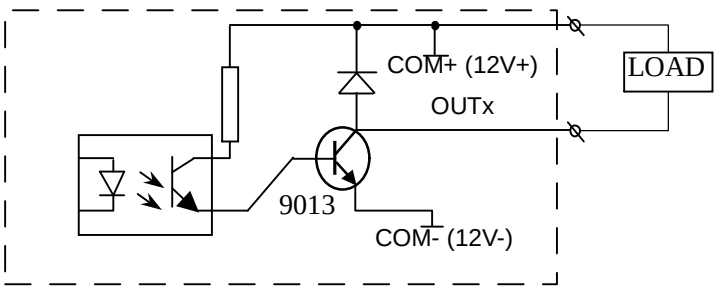

Chart 4: switch value

F output low level,in the out port,loader is connected,show lamp is on in the panel,define 1 vice versa

F the current electric of loader not >100mA ,whereas need extra power supply

Chapter four --controller connection sketch map

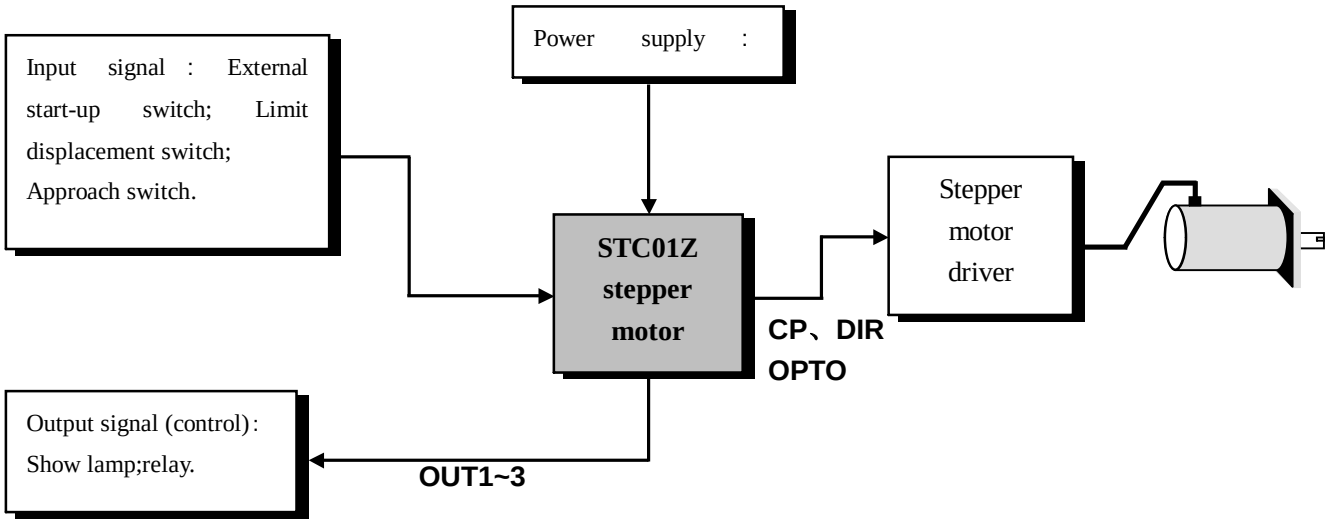

Chart 5: controller connecting sketch map

Chapter five Function flow chart:

controller have four running status: auto status、manual status、program edit status、parameter setup status。 After Electrify or press 复位, controller is under auto waiting state and coordinate bene place zero point, by now can startup program auto run or switch over manual status, parameter setup status and program edit status only switch over under manual state。After Edit program finished or parameter setup finished, press 退出 ket.return to manual state（ auto saved program)。At manual state , if you want to switch over edit program state, please press 编辑 key, want to switch over parameter setup state, please press 编参 key 2second more。

(note: key- press 编参 编辑 退出 are the same key-press actually, is composite of three key, when introduce one function, use one key-press name , same followed)

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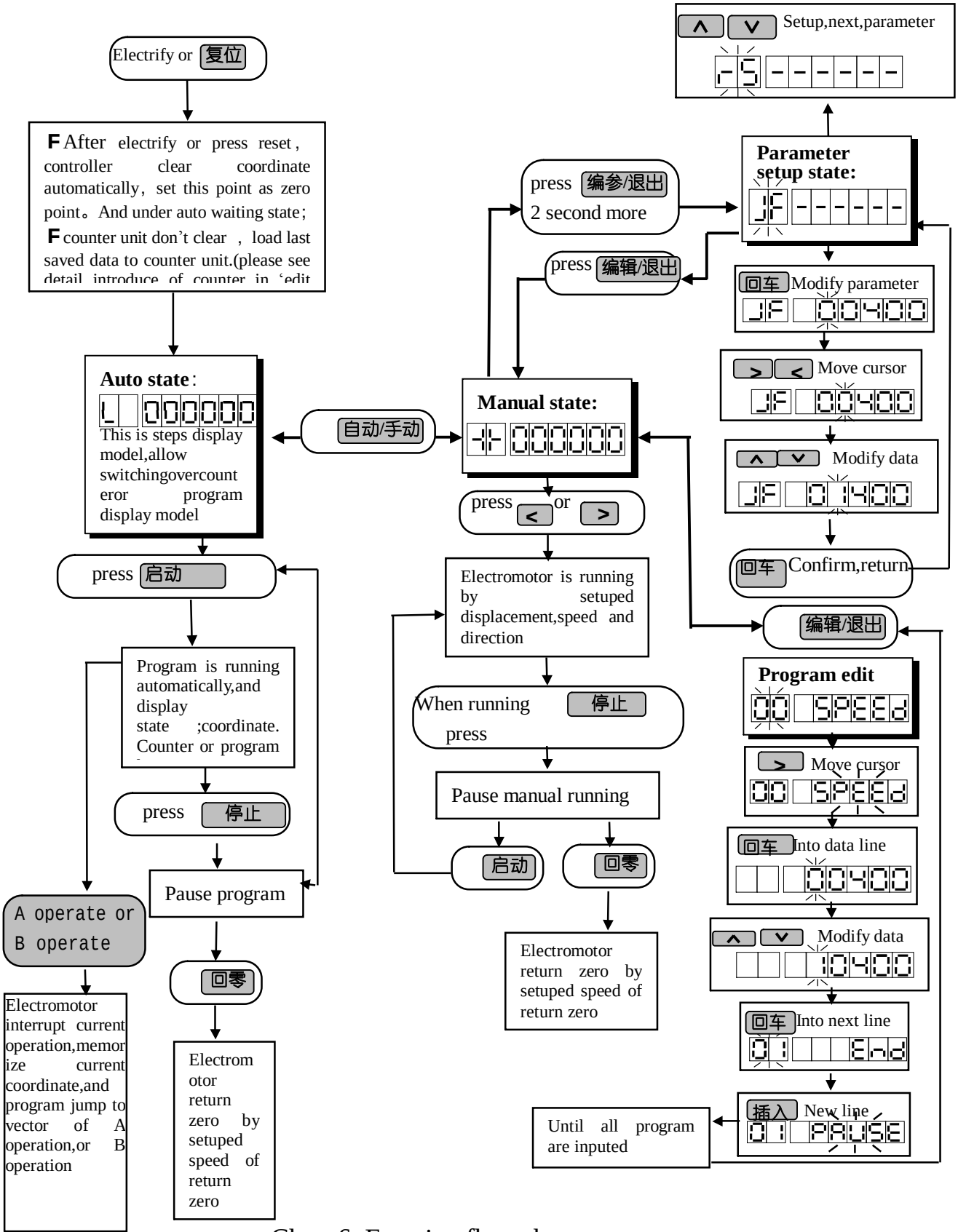
Setup,next,parameter
Electrify or 复位
F After electrify or press reset, controller clear coordinate automatically, set this point as zero point。And under auto waiting state;
F counter unit don't clear , load last saved data to counter unit.(please see detail introduce of counter in 'edit
Parameter setup state:
press 编参/退出 2 second more
press 编辑/退出
回车 Modify parameter
Move cursor
Modify data
回车 Confirm,return
Auto state:
This is steps display model,allow switchingovercount eror program display model
自动/手动
Manual state:
press 启动
press or
Electromotor is running by setuped displacement,speed and direction
编辑/退出
Program edit
Program is running automatically,and display state ;coordinate. Counter or program
When running press 停止
Pause manual running
press 停止
Pause program
启动
回零
Move cursor
回车 Into data line
Modify data
A operate or B operate
Electromotor return zero by setuped speed of return zero
回车 Into next line
Electromotor interrupt current operation,memorize current coordinate,and program jump to vector of A operation,or B operation
回零
Electromotor return zero by setuped speed of return zero
插入 New line
Until all program are inputed

Chart 6: Function flow chart

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chapter six edit parameter：

the way that pass in and out the parameter setup is ： under the manual state，press the 编参 key 2 second more，till pass in the parameter setup。 After finish setuping parameter，press key,retu退出manual state （parameter is saved auto)。

Parameter have two line，first line display parameter name，second line display parameter data。

The way of modify parameter：when pass in the parameter setup state，first line display JF------，and two bit in front of line is parameter name,that is twinkling；if press ∧ ∨ ，the line display before/behind parameter name。if press 回车 key，pass in the state of edit parameter at the second line，by now first bit of data is twinkling，if press ∧ ∨ ，data is changed。press < > key，turn to the next bit。After modify the data，press 回车 confirm,or press 取消 quit the modification。

In a word，setup parameter by means of pressing ∧ ∨ < > 取消 回车 six keys-press：cursor is moved to corresponding bit by pressing left and right key， led is twinkling，press up and down key，modify the data；press the enter key ,pass in the state of modify parameter，after modify the parameter，press the enter again for acknowledgement and quit press cancel key ,quit and not saved。Please consult 《operat flow table》。

sn	name	State of display	Rang of data(unit)	Explanation of parameter
1	Start frequency	JF- - - - - - JF XXXXX	400 -39999 （Hz）	If the data is low 400Hz,the system warn,user can setup different data, according as the needing of user
2	Curve of rise/fall	rS- - - - - - rS X	L、H (line)	There is two curves in the controller,L is slow; H is quick。Select different curve according as the practical situation
3	Clearance compensation	CC- - - - - - CC XXXX	0 –9999 （count of pulse）	Commonly be used for compensate fransfer mechanism(master screw ,gear),error that reverse compensation bring and displacement that is compensated are not displayed in the controller
4	Manual increment	HL- - - - - - HLXXXXX X	1 –999999 （pulse）	Under manual state，this is displayment of steppermotor when manual operation,if data is zero,system warn。
5	Manual speed	HF- - - - - - HF XXXXX	1 –39999 （Hz）	Under manual state, this is speed f stepermotor when manual operation.if data is zero,system warn
6	Speed of return zero	bF- - - - - - bF XXXXX	1 –39999 （Hz）	Speed of return zero when return zero opertion.if data is zero,system warn
7	Enterance address of A operation	nA- - - - - - nA XX	00 –99 （line NO）	when the program is running,the “A operation” port has signal of input.the steppermotor reduct the speed till stop.program is interrupted at this line.and remember the coordinate value at the interrupt.program jump enterance address of program of the “A operation”。
8	Enterance address of B operation	nB- - - - - - nB XX	00 –99 （line number）	when the program is running,the “B operation” port has signal of input.the steppermotor reduct the speed till stop.program is interrupted at this line.and remember the coordinate value at the interrupt.program jump enterance address of

				program of the “B operation”
9	Mode of pulse	CP- - - - - - CP X	0、1	CP=0 is single pulse，CPport output pulse DIR ouput direction of power level int the behind panel. CP=1 is double pulse.CP port output pulse of plus dirction,DIR output minus pulse.

Chapter seven Program edit and instruction explain：

the way that pass in and out the state of program edit is：under manual state ，press 编辑 key。When finish editing program，press 退出 ,return manual state（parameter is saved auto)。

The maximum load of the controller program is 99 rows，every line have a line number that is set automatically，begin to set from 00,if you insert or delete some lines，the line number will be set again automatically。

format of program is ：every program have two line（except program has no parameter)，the first line display line number and instruction name，second line display data of instruction。The last line of program is END

in a word ，edit program by means of pressing ∧ ∨ < > 插入 删除 回车 取消 eight keys; cursor is moved to corresponding bit by pressing left and right key， led is twinkling, press up and down key, modify the data；press the enter key ,pass in the state of modify parameter，after modify the parameter，press the enter again for acknowledgement and quit press cancel key ,quit and not saved. Please consult《operation flow table》.

Explanation of edit program

Edit parameter	Operation Step
enter the edit state	Under manual state，press 编辑。
quit the edit state	Under edit program state ，press 退出 ，return manual state， program is saved automatically。
clear the program	Under edit program state，press 清程 2 second more，press till that the 00 line is END。
Input program	first of all clear the program，there is only one line program，that is NO 00 line is END。Then press 插入 key ，NO.00 line instruction change to PAUSE，and is twinkling；press ∧ ∨ ， instruction name is changing ；till find to instruction you need，then press 回车 ,pass in the data erea（for no data program，after press enter,finish inputing the program)，modify data by pressing up and down key，press enter after set data，complete the line program 。could look at the next line change to END，press 插入 key again，use the same means to input program，till all program is completed 。the new means that input program is that insert the program before the END。 Special note： when input new program，there is very accurate program， system warn ，the error come forth in the jump instruction ：such as JUMP 、J-BIT、J-CNT。If the line number

	that jump to is greater than this line ,as a result the line of jump to is not input, the system warn. For avoid the case, when input program, demand that the line number of jump to is replace by 00,after complete the program,modify the line number of jump to .
Modify program	Consult the way of "input program", modify program。
insert program	When the line is twinkling , press 插入 key, before this line,insert a new line.and then edit the new line.
delete program	When the line is twinkling, press 删除 this line is deleted, the programs that is behind of this line are go up。
browse program	When the line is twinkling, press ∧ ∨ , could browse the all program.but you want to browse the parameter of the program,please press < , once, then the parameter is twinkling one second

Explanation of instruction (HH—line number , XXXXXXX—data)

SN	instruction	Mode of display	Explanation
1	Pause	HH_PAUSE No parameter	Program pause, waiting for one of them are startup key,startup signal,A operation ,and B operaion
2	Displacement	HH_G-LEN ±XXXXXXX	When execute this instruction; steppermotor is running according as the newest speed, displacement,start frequency, Curve of rise/fall, Clearance compensation. If no SPEED before this instruction,then startup frequency is default; the first bit of parameter is symbol bit.0 is plus,- is minus Range of parameter: -7999999 ~ +7999999 unit: count of pulse; If the data is 0,the system warn.
3	Speed	HH_SPEED XXXXX	The programs that is behind of this instruction are running according as this speed.untill the new speed is set. Range of parameter: 1 ~ 39999 unit: pulse/second (Hz); If the data is 0,the system warn.
4	delay	HH_DELAY XXXXXXX	Delay time; Range of parameter: 1 ~ 7999999 unit: millisecond; If the data is 0,the system warn.
5	Unconditional jump	HH__JUMP XX	Unconditional jump, parameter XX figure the line number jumped to ; If the XX number is greater than the number of END , the system warn.
6	loop	HH__LOOP XX XXXXX	Loop from this line to appointed line;two bit in front is line number(low than this line), last five bit is count of loop (define 0 is infinite)。When appointed line is greater than this line, the system warn.

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SN	instruction	Mode of display	Explanation
7	Goto some line	HH__GOTO ± XXXXXXX	Program run to the appointed line, usually , the line is system reference point. The first bit is symbol , plus define that appointed line locate plus direction of zero、minus define that the line locate minus direction of zero; if parameter=0, define retrun zero; Range of parameter: -7999999 ~ +7999999 unit: count of pulse.
8	Output	HH___OUT XXXX	Three bits in front of paramter define out1~3.every bit has 3 option: 0、1、N: 0 -----is high level, load do not turnon, the show lamp off; 1 -----is low level , load turnon, the show lamp on; N -----holding the last state。 The last bit is design for buzzer specially: 0 -----when execute the line , buzzer give forth short blast; (note: after the blast is end execute the next line) 1 ----- when execute the line , buzzer give forth long blast; (note: after the blast is end execute the next line) N ----- when execute the line,the buzzer don't work.
9	Jump for Detect bit	HH_J-BIT XX X X	Two bits in front is the line number,that define jump to the address ,the fifth bit is one of both IN1 and IN 2;the eighth bit is condition of jump(0/1);when detected input is condition is set,jump to the appointed line,whereas execute sequentially .
10	Jump for count	HH_J-CNT XX XXXXX	Two bits in front is line number,that the program jump to.the last five bits is data.when the counter is greater than the data,the program jump to the appointed line, whereas execute sequentially. If the line number is greater than the END number, system will warn.
11	Variable Displacement	HH_GO-AB ±X	The mode of instruction function is the same as, HH_G-LEN ± XXXXXXX, dissimilarity is the displacement is not constant, but a variable , that brought by interrupt , when the newest interrupt happened, the steppermotor droop speed and stop, then the coordinate value is the variable, because the controller has A operation and B operation , in the eighth bit A、B respectively denote variable of A and B, C variable denote the remainder displacement of the displacement instruction is interrupted,when the newest interrupt happens, the variable have symbol, the seventh bit is symbol bit, 0 denote sameness of parameter and variable, -denote opposition of parameter and variable.
12	Counter +1	HH_CNT-1 No parameter	The instruction is related to counter, the controller have acounter, capacity is 999999, the counter value can be displayed under counter state at real time; if power is off the counter value is not saved, unless you press the counter save [>]。 after the controller startup, the last saved value is writed in the counter.the instruction execute operation that counter add 1.
13	Clear counter	HH_CNT-0 No parameter	The instruction is related to counter; Clear the counter.besides the instruction, that press the clear counter key-press [V] can clear the counter, under the auto state.
14	Clear coordinate	HH_CLR	After execute the instruction,coordinate value and display of the value is changed to zero.the steppermotor regard the point is new zero point.

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SN	instruction	Mode of display	Explanation
15	end	HH___END No parameter	Program is end line,when program execute the line,controller end all program auto,and return waiting state. The instruction is the last line all the times

chapter eight manual mode：

under the auto state,press 自动/手动 could pass in the manual state，the two bit in front display , denote that is under manual state.press < or > steppermotor is running according as the different direction，the displacement value and speed are set by HL and HF under the manual state，please consult “chart 6:controller operation flow chart”.

Chapter nine auto-running mode：

After the controller startup or reset,clear coordinate auto,and regard the point as the new zero point, the last saved counter value is writed in the counter.and then waiting.press 启动 or input the startup signal,the controller circulates from the 00 line to the END,the program is end，the controller return the waiting state. please consult “chart 6:controller operation flow chart”.

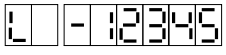
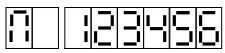
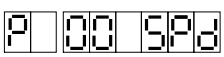
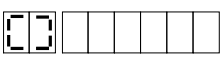
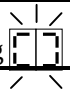
under auto state,there are three sub-states.:

1. waiting state: the control is ready for running，press 启动 or input the startup signal， startup program.when program is end .controller is under the waiting state.
2. auto running state: the controller is running.
3. auto stop state: when the controller is running,press 停止 or input stop signal from port,program is interrupted，the program is waiting for startup signal again.

Under auto state, there are three different modes of display：（switch the display by pressing 步数 计数 ∧

1. mode of step display:display the coordinate at real time ,unit : pulse counter;
2. mode of counter display: display the value of the counter，unit :number;
3. mode of program display: display the program and it’s name at real time.

For distinguish three sub-states and three display states，we distinguish them from others by means of that the two bits in front displaye different words ：（followed chart）

display	state	Explanation
	Mode of coordinate display ,under waiting state.	The last six bits display coordinate,(contain symbol bit),if the coordinate is beyond the six bits,only display the last six bits of coordinate .
	Mode of count display,under waiting state	The last six bits display counter. If the counter value is beyond the six bits, only display the last six bits of value.
	Mode of program display,under waiting state	The last six bits display program,the third and forth bits display the line number,the fifth is empty,the sixth,seventh,eighth bits display short name of instruction.（consult《instruction table》）
	Step,counter,program thress modes of display Under running state	under the running state the two bits in front ind three modes of display is same， denote that the program is running.
	Step,counter,program thress modes of display	The two bits in front is twinkling  denote that the

	Under stop state	program stop.and is waiting for the startup.

Chapter ten size of view and size of installation：

The controller use the flush type appearance' crust, small volume ,light weight (500g)，panel in front is 96mm×96mm，length is 122mm， consult the behind chart：

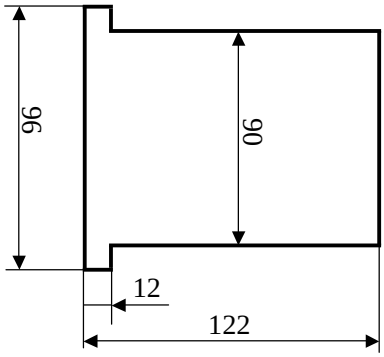


Chart 7: size of view and size of installation

Chapter eleven: Programme and example of application

Example one

Program request：Start frequency 2.5KHz，Curve of rise/fall use H，Clearance compensation is 0；

Circulate request：run 98765 step at 2.9Khz speed，then run in contrary direction 8765 step at 15 KHz speed，and stop.

List of parameter (modify them under the state of setup parameter）JF=02500，rS=H，CC=0000。

List of program : (under the state of edit program)

```
00    SPEED   02900        ；set speed is 2.9KHz
01    G-LEN    00098765    ；steppermotor run in forward direction 98765 step.
02    SPEED   15000        ；set speed is 15 KHz
03    G-LEN    -0008765    ；run in contrary direction 8765step
04    END                  ；program is end.
```

Example two

Program request：Start frequency 2.5KHz，Curve of rise/fall use L，Clearance compensation is 12；

Circulate request： when startup the buzzer give forth short blast,then run 1234567 step at 39 Khz speed，the

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three ouput are holding 101. delay 55.9s,the last two output are 11,program pause, untill startup again. The steppermotor is running at the same speed to the point of another side 888 step. When arrive at the point.buzzer give forth long blast.

List of parameter: (modify them under the state of setup parameter) JF=02500, rS=L, CC=0012。

List of program: (under the state of edit program)

```
00   OUT   nnn0          ; buzzer give forth short blast.
01   SPEED  39000        ; set speed is  39KHz
02   G-LEN   01234567    ; run in forward direction 1234567 step.
03   OUT   101n          ; three ouput is 101
04   DELAY   0055900     ; delay 55.9s
05   OUT   n11n          ; the last two output is 11
06   PAUSE               ; program pause
07   GOTO   -0000888     ; return another side 888step.
08   OUT   nnn1          ; long blast
09   END                 ; end
```

Example three

Circulate request:(overleap parameter setup) there is a thing ,that run 100 step from zero at 2.9KHz speed(the point is reference point); stop at the reference point and output 010; detect input port, if IN1=0, steppermotor return zero.if IN1≠0,the steppermotor run 10000 step at 15 KHz speed, then short blast for warn; return the reference point at 35 KHz speed. If then IN1=0, return zero, whereas continue to loop the first mode, request : return zero, long blast for alarm

List of program: (under the state of edit program)

```
00   SPEED   02900       ; set speed  is 2.9KHz
01   G-LEN   00000100    ; run in forward direction 100 step
02   OUT   010n          ; output is 010
03   J-BIT   10   1   0  ; detect  state of IN1, is 0 ,return zero.
04   SPEED   15000       ; if IN1≠0, set speed is  15KHz
05   G-LEN   00010000    ;  run in forward direction 10000 step again
06   OUT   nnn0          ; short blast.
07   SPEED   35000       ; set return reference point speed is 35 KHz
08   GOTO   00000100     ; return reference point at speed 35KHz
09   LOOP   03   00000   ;  ending loop, untill detect IN1=0 ,then return zero.
10   SPEED   02900       ; return zero speed is 2.9KHz
11   GOTO   00000000     ; return zero
12   OUT   nnn1          ; long blast for alarm
13   END                 ; end.
```

Example four

Circulate request: (overleap parameter setup) some thing is running from zero at 39KHz,until encounter the switch in front , then return zero at the same speed, end. (in the system Start frequency is 500Hz, distince from

zero to switch is greater than 100000,and shorter than 100010）

Program analysis: the displacement is not a accurate value, is in a range (belong to variable control) .we resolve the problem by the interrupt operation . connect the switch to port of A operation. because steppermotor fall the speed and stop. If run to the switch at high speed only, give forth overshoot certainly, for avoid overshoot, run at high speed in advance and then run at low speed,(lower than the Start frequency)

Set parameter:（modify them under the state of setup parameter) set enterance address of 0A operation is nA=04.

List of program:（under the state of edit program）

```
00    SPEED   39000      ; set speed is 39kHz.
01    G-LEN    0099000   ;  run at high speed, but not encounter the switch.
02    SPEED    00400     ; the speed is lower than Start frequency
03    G-LEN     07999999 ; set a long displacement to encounter switch.
04    SPEED    39000     ; enterance of A operation, re turn zero speed 39KHz
05    GO-AB     -A       ; in contrary direction, run the same displacement, return zero
06    END                ; end
```

Example five

Circulate request:（overleap parameter setup）some thing make the reciprocate between the two switchs (A--B)。distance of between A、B is greater than 100000 step, is short than 100010, start point is random (but move to A first), after loop 800 times ,stop A, buzzer sound long blast for end. Counter display the loop time,speed is 20 KHz, Start frequency is 500Hz。

Program analysis: because the start point is zero point, suppose from zero to B is+ direction,from zero to A is - direction, the example is the same as four belong to vriable control.

Set parameter:（modify them under the state of setup parameter）set enterance address of 0A operation is nA=03、set enterance address of B operation is nB=09., overleap other parameter.

List of program:（before execute the program, set the mode of counter display）

```
00    CNT-0              ; clear counter
01    SPEED   00400      ; set speed is 400Hz (< Start frequency 500Hz, for avoid overshoot)
02    G-LEN   -7999999   ;  move to A at low speed , untill encounter switch A.
03    CNT-1              ; enterance of A, counter add one.
04    J-CNT   00  800    ; loop time reach 800 times, transfer; if no reach 800, execute the next instruction.
05    SPEED   20000      ; speed 20KHz
06    G-LEN   0099000    ;  run to B at the 20KHz
07    SPEED   00400      ; the low speed is lower than Start frequency
08    G-LEN    07999999  ; be about to arrive B, encounter B at the low speed.
09    SPEED   20000      ; enterance of B, speed 20KHz
10    G-LEN   0099000    ; move to A at 20KHz speed
11    SPEED   00400      ; the low speed is lower than Start frequency
12    G-LEN    07999999  ; be about to arrive A, encounter A at the low speed
13    OUT     NNN1       ; loop time reaches 800 time, buzzer sound long blast
14    END                ; end
```

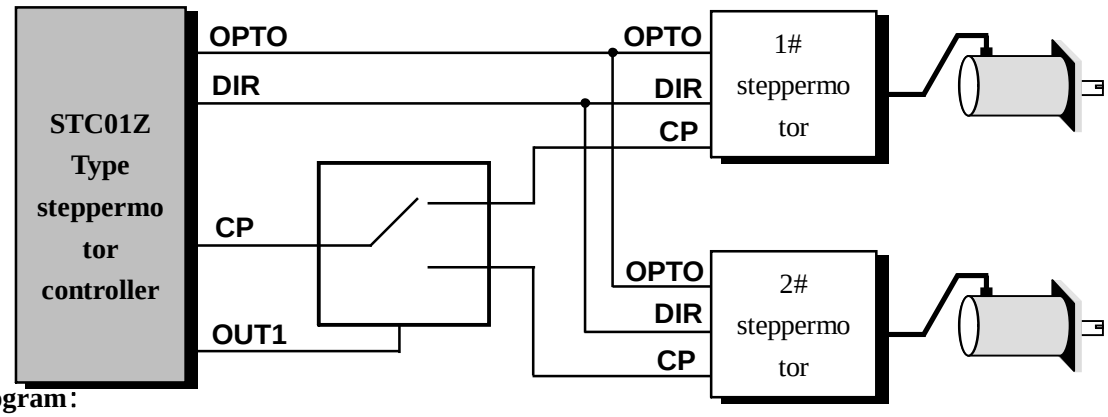
Example six:STC01Zcontroller control two driver of motor at no same time

Circulate request：the two steppermotor are running at not same time，1# steppermotor move 7777 step at 7KHz speed ，stop and wait 1s，2# steppermotor move 8888step at 8KHz speed, stop .after 5s both return zero at 9KHz speed ,program is over.

Program analysis：because both are working at not same time,we can switch CP pulse by the single-pole double-throw relay if demand to switch quickly，could select the electronic switch. Regard ouput port （DC12V）as control port。

Set parameter：（overleap set parameter）

sketch map：



List of program：

```
00   OUT      0NNN      ;  switch CP to 1#（the example  regard OUT1 as switch control）
01   SPEED    07000     ; 1#run at speed  7KHz
02   G-LEN     7777     ; 1# move 7777step
03   OUT      1NNN      ; switch CP to 2#
04   DELAY    1000      ; delay 1s
05   SPEED    08000     ; speed of  2#  is 8KHz
06   G-LEN     8888     ; 2# move 8888 step
07   OUT      0NNN      ; switch CP to 1#
08   DELAY    5000      ; delay 5s
09   SPEED    09000     ; the common speed is 9KHz
10   G-LEN    -7777     ; 1# return zero first
11   OUT      1NNN      ; switch CP to 2#
12   DELAY    0500      ; delay 0.5s（the time is relay switch time ）
13   G-LEN    -8888     ; 2# return zero
14   END                ; end
```

Example seven: STC01Z-----advanced Roboticized bag machine controller

System scheme:STC01Z controller、two-phase steppermotor 130BYG250A（or three-phase130BC3100A）、driver SH-2H130MH（orSH-3F130MH）、apolegamic AC220V isolating transformer ,perimeter of clamping roller200mm.

Besides STC01Z，1.there is a valid/invalid key-press(self locking key-press)：when press the key,the steppermotor is startuped, when the key is up,even if there is a photoswitch signal, the steppermotor do not run. 2.printing/fixed length key-press(self locking key-press):when down,is printing,when up ,is fixed length.

Circulate request：for example of bag length 500mm，under fixed length mode,startup each time，move 500mm

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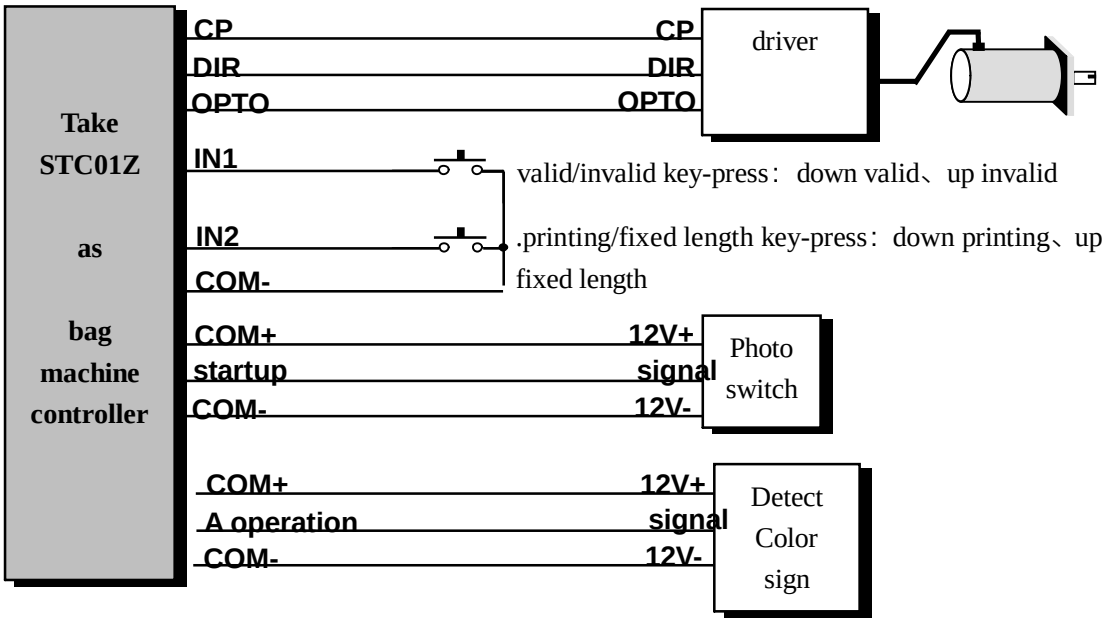
at high speed,under fixed length mode,startup each time ,move 480mm at high speed, then search color sign at low speed. stop when find color sign. if move to 510mm, do not find still the color sign, judge that is fault, stop and warn at once (short blast 100 times) .demand to sound the long blast 10 times to warn,when produce 50000.at the time clear the counter, take count over again.

There are clear counter key [V] and save counter key [>] ,use them at any moment.

Program analysis: for example of two-phase steppermotor, work under 20 subdivision state. The step angle is 0.09°, pulse count: 20CP pulse/mm。

Set parameter: (under the set parameter) JF=1000, rS=H, CC=0, HL=10, HF=1000, bF=1000, nA=12, nB=00



note: The procedure that we provide may disaccord your request, But we would be free to design the procedure and the hardware that you be satisfied with for you!

List of program: (before startup, pass in the mode of count display)

```
00   J-BIT     18  1  1     ; if the valid/invalid key is invalid(not down,IN1=1),return
01   SPEED     28000         ; suppose the high speed is 28KHz
02   J-BIT     05  2  0     ; if the printing/fixed length key is down (mode of printing, IN2=0) ,jump to line 5.
03   G-LEN     10000         ; under the fixed length state, steppermotor move 500 mm (10000step)
04   JUMP      12            ; jump to line 12
05   G-LEN     9600          ; under the printing state, motor move 480 mm (9600step ) at high speed
06   SPEED     1000          ; suppose the speed search the color sign is 1KHz
07   G-LEN     600           ; search the color sign at low speed, if find it ,jump to entrance address of A operation
08   OUT       NNN0          ; move to 510mm, still find the color sign, short blast to warn (100times)
```

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```
09    DELAY    200          ; delay 0.2s
10    LOOP     07   100     ; short blast 100 times
11    JUMP     18           ; jump to end
12    CNT-1                 ; entrance address of A operation, find the color sign, motor stop, counter
add one
13    J-CNT    15   50000   ; if the counter =50000, jump to 15 line
14    JUMP     18           ; if the counter <50000, jump to end
15    OUT      NNN1         ; long blast to warn (10 times)
16    DELAY    200          ; delay 0.2s
17    LOOP     07   10      ; long blast to warn10times
18    END                   ;end
```

Example eight STC01Z------advanced Roboticized cut machine controller

System scheme: STC01Z controller、two-phase steppermotor 130BYG250A (or three-phase130BC3100A)、driver SH-2H130MH (orSH-3F130MH)、apolegamic AC220V isolating transformer ,perimeter of clamping roller200mm.

Besides STC01Z, 1.there is a valid/invalid key-press(self locking key-press): when press the key,the steppermotor is startuped, when the key is up,even if there is a photoswitch signal, the steppermotor do not run.

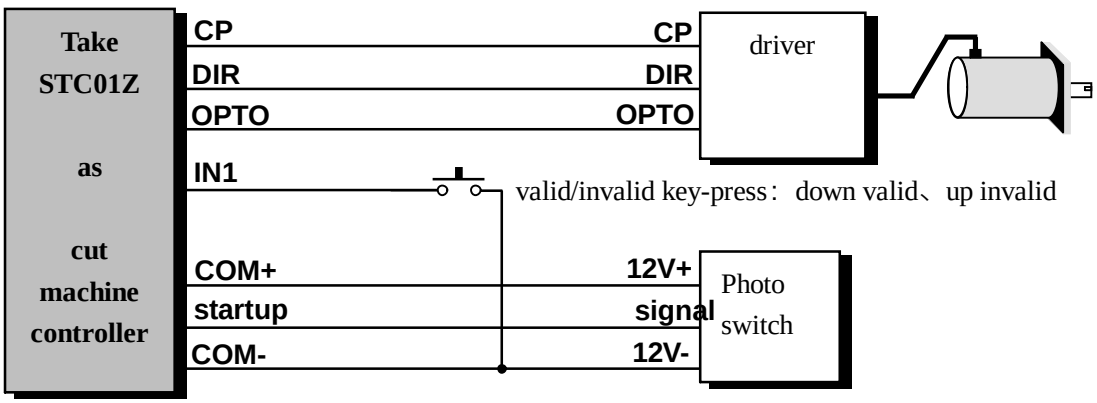
Circulate request: for example of length of cut paper 500mm,startup each time, move 500mm at high speed demand to sound the long blast 10 times to warn, when produce 50000.at the time clear the counter, take count over again.

There are clear counter key [V] and save counter key [>] ,use them at any moment.

Program analysis: for example of two-phase steppermotor, work under 20 subdivision state. The step angle is 0.09°, pulse count: 20CP pulse/mm.

Set parameter: (under the set parameter) JF=1000, rS=H, CC=0, HL=10, HF=1000, bF=1000, nA=00, nB=00

Set this parameter based on the frondose cut machine



note: The procedure that we provide may disaccord your request, But we would be free to design the procedure and the hardware that you be satisfied with for you!

List of program: (before startup, pass in the mode of count display)

```
00    J-BIT    09   1   1    ; if the valid/invalid key is invalid(not down,IN1=1),return
01    SPEED    28000         ; suppose the high speed is 28KHz
```

```
02    G-LEN     10000        ; move 500 mm（10000step）
03    CNT-1                  ; counter add one
04    J-CNT     06   50000   ; if the counter=50000，jump to line 6
05    JUMP      09           ; the counter<50000,jump to end
06    OUT       NNN1         ;long blast to warn (10times)
07    DELAY     200          ; delay 0.2s
08    LOOP      07   10      ; long blast10times
09    END                    ;end
```

Example nine STC01Z------advanced Powder packing machine controller

System scheme:STC01Zcontroller、two-phase steppermotor110BYG250A(or three-phase110BC380)、driver SH-2H110ML/H（or SH-3F110ML/H）、apolegamic AC120V/AC220V isolating transformer. Besides STC01Z，1.there is a valid/invalid key-press(self locking key-press)：when press the key,the steppermotor is startuped, when the key is up,even if there is a photoswitch signal, the steppermotor do not run

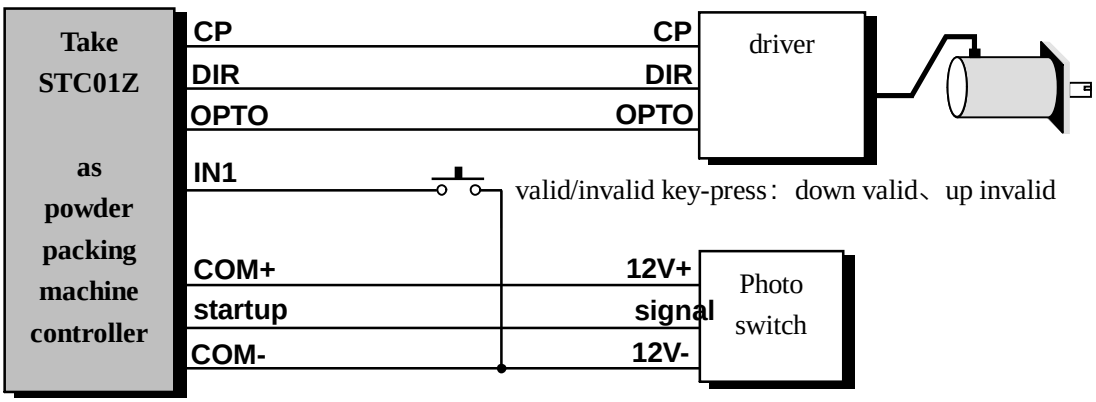
Circulate request：for example of the speed of principal axis 2 circle/s.the principal axis rotate one circle,the motor is startup once, the motor drive the scroll bar 1 circle in 0.25s. demand to sound the long blast 10 times to warn, when produce 50000 bag.at the time clear the counter, take count over again.

There are clear counter key [V] and save counter key [>] ,use them at any moment.

Program analysis：for example of two-phase steppermotor，work under 20 subdivision state. The step angle is 0.09°，pulse count：20CP pulse/mm.

Set parameter：（under the set parameter）JF=1000，rS=H，CC=0，HL=10，HF=1000，bF=1000，nA=00，nB=00

Set this parameter based on the frondose powder packing machine



Note: The procedure that we provide may disaccord your request，But we would be free to design the procedure and the hardware that you be satisfied with for you!

List of program：（before startup，pass in the mode of count display）

```
00    J-BIT     09   1   1    ; if the valid/invalid key is invalid(not down,IN1=1),return
01    SPEED     38000         ;set the speed is 38KHz
```

```
02    G-LEN      4000          ; rotate 1circle（4000step）
03    CNT-1                    ; the counter add 1
04    J-CNT      06   50000    ; if the counter=50000，jump to line 6
05    JUMP       09            ; the counter<50000,jump to end
06    OUT        NNN1          ; long blast to warn (10times)
07    DELAY      200           ; delay 0.2s
08    LOOP       07   10       ; long blast10times
09    END                      ;end
```

instruction table：

sn	name	example	Explanation,range and unit	Full name	Short name
1	Pause	00 **PAUSE**	Program is paused and wait for startup siganl	PAUSE	PAU
2	Displacemetn	01 **G-LEN** -1234567	Move 1234567step at new SPEED，contrary direction；-7999999 ~ +7999999、pulse	G-LEN	G-L
3	Set speed	02 **SPEED** 12345	Set the newest speed is 12345 Hz 1 ~ 39999、pulse/s（Hz）;	SPEED	SPD
4	Delay	03 **DELAY** 1234567	delay：1234567ms 1 ~ 7999999、ms	DELAY	DLY
5	Unconditional jump	04 **JUMP** 12	Unconditional jump to line 12 00~ 99、line number	JUMP	JMP
6	Loop	05 **LOOP** 03 12345	从 this line （05）jump to 03 loop12345times 1~99999（0 define endess）、time（only forward loop）	LOOP	LOP
7	Goto some line	06 **GOTO** -1234567	Steppermotor move to -1234567 point -7999999 ~ +7999999、pulse（0 return zero）	GOTO	GOT
8	Output	07 **OUT** 03 01 N 0	Output value :OUT1=0 、 OUT2=1 、 OUT3state is constant..buzzer sound short(1=long ,N=no)	OUT	OUT
9	Detect bit And jump	08 **J-BIT** 19 2 0	If IN2=0 , jump to line 19,the 1 、 2 bit=line number,5bit=input , 8bit=jump state	J-BIT	J-B
10	Take count And jump	09 **J-CNT** 20 12345	If counter value≥12345,jump to line20 0~59999、natural number.	J-CNT	J-C
11	Variable parameter	10 **GO-AB** -A	The steppermotor circulate:displacement is sbsolute value of A、direction contrary A ±A、±B、pulse（note：A、Bhave symbol）	GO-AB	GAB
12	Counter add 1	11 **CNT-1**	Counter add one（max999999）	CNT-1	CN1
13	Clear counter	12 **CNT-0**	Counter is zero	CNT-0	CN0
14	Clear coordinate	13 **CLR**	Coordinate is zero.the point is new zero point	CLR	CLR
15	end	13 **END**	Program's end line,can't edit,is in the end of program.	End	End

key-press table

Key-press	function	explanation	Under state	Operation guide
启动 回车	**Startup**	Startup program Continue to execute program	Waiting state; After run,stop state; Execute PAUSE	Click
	Enter	Confirm parameter edited Confirm program edited	Edit program state; Set parameter state	Click
停止 取消	**Stop**	Pause program running under auto; Pause program running under manual	Auto-running state Manual state	Click
	Cancel	Cancel parameter edited Cancel program edited	Edit program state; Set parameter state	Click
回零 清程 删除	**Return zero**	Motor return zero(position when startup)	Waiting state; After run,stop state; Manual state	Click
	Clear program	Clear all program	Edit program state	Press 2 second more
	Delete	Delete program	Edit program state	Click
自动 手动 插入	**Auto**	Pass in auto state	Manual state;	Click
	Manual	Pass in manual state	Auto-running state	click
	Insert	Insert one line before this line	Edit program state	Click
步数 计数 ∧	**Step**	Pass in mode of step display	Waiting state	Click
	Counter	Pass in mode of counter display	Waiting state	Click
	Program	Pass in mode of program display	Waiting state	Click
编辑 编参 退出	**Edit**	Pass in edit program state	Manual state	Click
	Edit parameter	Pass in set parameter state	Manual state	Press 2 second more
	Quit	Return manual state from edit program state or set parameter,and save program and parameter modified	Edit program state; Set parameter state	Click
<	**left move cursor**	Move to left	Edit program state; Set parameter state	Click
	browse program	When browse program,only display line number and program name,want ot see the data of program, please press the key,data is twinkling 1s,then Return	Edit program state	Click
∨	**down move cursor**	Move to the next line	Edit program state; Set parameter state	Click
	clear counter	The counter is zero	Waiting state	Click
>	**right move cursor**	Move to right	Edit program state; Set parameter state	Click
	Save counter	Save the value of counter	Waiting state	click
复位	**reset**	Reset the scm in the controller		

parameter table：

	name	example	range	unit	Explanation	
1	Start frequency	**JF** 12345	400 –39999	Hz	According as size of motor and inertia of loader select	
2	Curve of rise/fall	**rS** H	L、H	Line	L is low,H is fast(optimization)	
3	Clearance compensation	**CC** 1234	0 –9999	Pulse	compensate fransfer’s reverse clearance	
4	Manual increment	**HL**123456	1 –999999	Pulse	Under munual state, this is displacement.	
5	Manual speed	**HF** 12345	1 –39999	Hz	Under manual state ,this is speed	
6	Speed of return zero	**bF** 12345	1 –39999	Hz	When Return zero,this is speed	
7	Enterance address of A operation	**nA** 18	00 –99	Line NO	Aoperation（interrupt）, entrance address	
8	Enterance address of B operation	**nB** 18	00 –99	Line NO	B operation（interrupt）, entrance address	
9	Mode of pulse	**CP** 0	0、1		CP=0is single pulse、CP=1 is double pulse	

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